

REMARKS/ARGUMENTS

Claims 1-5, 8, 10-15 and 22-23 remain active in the application. Of these, Claims 1, 8, 22 and 23 have been amended to clarify that the rod shaped electrode is dipped into a liquid.

Prosecution has been reopened in view of newly applied prior art. Applicants nonetheless submit that the claims defined over any combination of the cited prior art.

As has previously been explained, the invention is based upon the recognition that a rod shaped electrode having a diameter which is not more than 1 millimeter and dipped into a liquid in a high voltage treatment apparatus exhibits a field strength larger than 500 kV/cm the vicinity of the electrode dipped into the liquid, even where the input voltage is maintained at a low value. For example, Figure 4 illustrates that the field strength increases exponentially adjacent at the rod shaped electrode dipped in a liquid where the electrode diameter is 1 millimeter or less. Figure 8 provides evidence that this increase is unexpected from calculation based upon standard equations.

All of the claims were rejected under 35 U.S.C. § 102 as being either anticipated or rendered obvious by the newly cited U.S. patent 5,766,447 (Creighton). This rejection is respectfully traversed.

Examiner has relied upon Figure 5 of Creighton, particularly the description in column 9 that the needle electrodes 124 have a diameter of 0.8 millimeters. Creighton is directed to a method and apparatus for treating an aqueous solution using a pulsed electric field generated between two electrodes. Creighton is concerned with the possibility of arc discharges, which are supposedly minimized in the reference by covering the electrodes with a layer of dielectric material. For example, in the embodiment of Figure 5 the electrode 130 is covered with dielectric layer 132. On the other hand, *the needles 124 are not immersed in the liquid to be treated*, but are instead held within a gas filled space 137 provided for

distribution of oxygen containing gas. As is evident from Figure 5a, the needles 124 terminate at the gas outlets.

Claim 1 recites a high voltage treatment equipment including a rod shaped electrode *dipped into liquid* and means for providing a region in the vicinity of the electrode dipped into the liquid whose field strength is raised to a value larger than 500 kV/cm. As already mentioned, the rod shaped electrodes 134 of Creighton are not dipped into the liquid but are retained in a gas space. Additionally, contrary to the allegation that a field strength larger than kV/cm is inherent in Creighton, the specification of Creighton specifies that a “very high” electric field is only 100 kV/cm, i.e., no more than 20% of that recited in Claim 1. Creighton thus does not provide the function of the claimed “means for applying a pulsed power between electrodes of said pair of electrodes to provide a region whose field strength is raised to a value larger than 500 kV/cm.” Creighton thus does not anticipate Claim 1.

Creighton also fails to anticipate the subject matter of Claim 2. Claim 2 recites a high voltage treatment equipment wherein at least one electrode dipped into the liquid is a rod shaped electrode whose diameter is not more than 1 millimeter. As noted above, the needle electrodes 124 of Creighton *are not dipped into the treating liquid* and so Claim 2 and its dependent claims are similarly not anticipated by Creighton.

Regarding the obviousness of the claims over Creighton, the Examiner is again reminded that a *prima facie* case of obviousness based on the overlap of ranges may be overcome by objective evidence of criticality for the claimed range, for example comparative data in the specification showing that the claimed range achieves unexpected results. MPEP § 2144.05(III). Here, any *prima facie* case of obviousness which may exist by virtue of an overlap of claimed ranges is overcome by the evidence of unexpectedly improved results set forth in the specification, particularly at Figure 4 and 8. This is described in more detail in the Appeal Brief. The claims therefore clearly define over Creighton.

Claim 8 recites a high voltage treatment equipment wherein a rod shaped electrode has a diameter of not more than 1 millimeter and is dipped into a liquid. Claim 22 recites a field strength larger than 500 kV/cm for the rod shaped electrode having a diameter of not more than 1 millimeter and being dipped into a liquid. Claim 23 further recites the claimed field strength for a voltage of not more than 100 kV. As discussed above, these features are not taught by Creighton. Claim 8 further recites a movement mechanism for moving the rod shaped electrode dipped into the liquid so as to change a relative position with respect to the other electrode. The Examiner has alleged that this is taught in Creighton by the description that the distance between the grounded electrode and the tips of the needles 134 is “variable between 4 and 10 mm.” However, Applicants respectfully submit that Creighton does not teach or suggest a movement mechanism for moving the electrodes. It is noted that no movement mechanism is otherwise described or illustrated in Figure 5 of Creighton. Nor does the relied upon portion of the description in Creighton indicate the presence of a movement mechanism; it only indicates that the spacing between electrodes is not critical so long as it is between 4 and 10 millimeters. For this reason as well as the reasons discussed above, Claims 8, 22 and 23 clearly define over Creighton.

The claims were also rejected under 35 U.S.C. § 103 as being obvious over Locke et al. in view of Creighton. The Examiner there alleged that Locke et al. teaches all of the claimed features other than the diameter of the hypodermic needle and the claimed field strength. The Examiner further alleged that these features would nonetheless have been obvious in Locke et al. in view of the teachings of Creighton. However, as discussed above, Creighton teaches only a field strength as high as 100 kV/cm and fails to teach a rod shaped electrode dipped into a liquid and having the claimed diameter. Creighton is therefore incapable of supplying the missing features of Lock et al. In any case, as already mentioned,

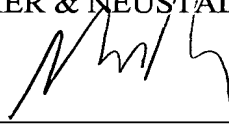
the evidence of unexpected improved results set forth in the specification would overcome even a *prima facie* case of obviousness.

Concerning paragraph 6 of the Office Action, Creighton was cited to teach the obviousness of providing a movement mechanism in Locke et al. However, since no movement mechanism is in fact taught in Creighton, as discussed above, it could provide no teaching for such a movement mechanism in Locke et al.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

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